



**Ice & Snow**

Frozen Solid?





# Cooling Units

Fairbanks, AK



Permafrost is not necessarily Permanent





Just getting to  
work can be tough!

Taylor HWY



# Wanted:

- Individual willing to travel in Alaska
- Must work in all weather conditions
- Must have reliable transportation
- Positive Attitude Required








**Erosion is the same everywhere.  
Just different, like everywhere else.**



# Thermal Degradation / Freeze Thaw Erosion

- 
- Freezing & Thawing detaches soil particles and causes down-slope movement
  - Frost loosened soil is more susceptible to erosion by rain and snowmelt
  - Eroded soil can become saturated with spring breakup resulting in mass movement



Easier to Prepare Than Repair







Longevity  
Break Up Survival





Even in Winter  
Water Will Flow



# Where Will It Go?

## 2 Choices

- Slow it Down
- Armor For the Flows





# Preparing for Winter Shutdown





# Stabilization:

- Waste, overburden
- Cut slopes
- Material source roads

Dalton Highway





# Plan Ahead



Avoid preparing for spring  
break-up & runoff the hard way!



**Frozen Ground?**

**Wattles Anchored  
With Form Stakes**


**Anchorage**

**Blanket Anchored With Sandbags**





# Frozen Ground Solutions



Rebar Stakes & Wire

Fox Spring



# Frozen Ground Installation



Photo Courtesy Michael Travis



# Wire Backed Silt Fence Sand Bag Toe & J Hooks



Ketchikan





**Inlet Protection vs.  
Plow Destruction**





# Kodiak, Alaska

Pop. 6228











17 11:33AM





7 10:29AM



# Materials Separation





# Frozen Soil Compaction



12 4:35





# Tidal Intrusion



14 8:37AM





25 4:33PM







Kotzebue, AK

Pop. 3237









Provide a defined perimeter in the plans

Kotzebue, AK





Kotzebue, AK





# Velocity Control











Piles of RECP's





**Logistics**



# Seed Selection / Schedule:

- Species / Climate
- Germination & Establishment
- Timing & Field Mortality













# Provide Jobs Using Local Labor



















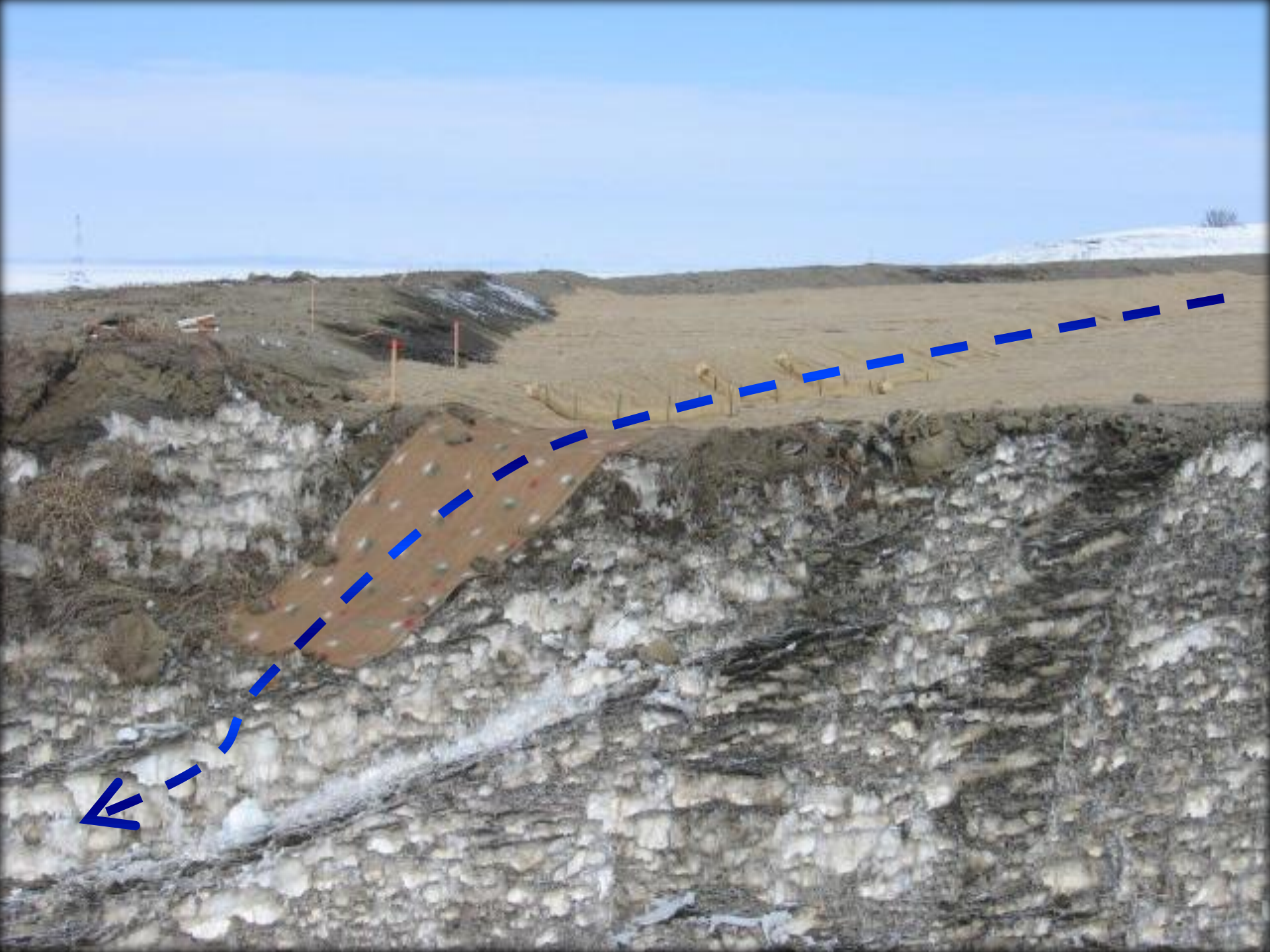














# Over the Top?





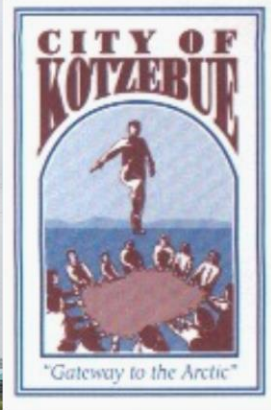
# Over the Top?











# City Ball Park Construction



Installed September 2014



# New Technologies: Biotic Soil Amendments







Mid October



# Current Conditions







# Nine Mile Hill Reconstruction























Waste pile stabilization













Innovation from the front lines







# Early Morning in Bethel Alaska

Pop. 6400









# Here's the catch...

- Sequence for seeding was not typical.
- Instead of temporary seeding, concurrent embankment and *permanent* seeding operations were conducted.





# Standard Operating Procedure

Seeding was a normal operation conducted as needed throughout the active construction period.











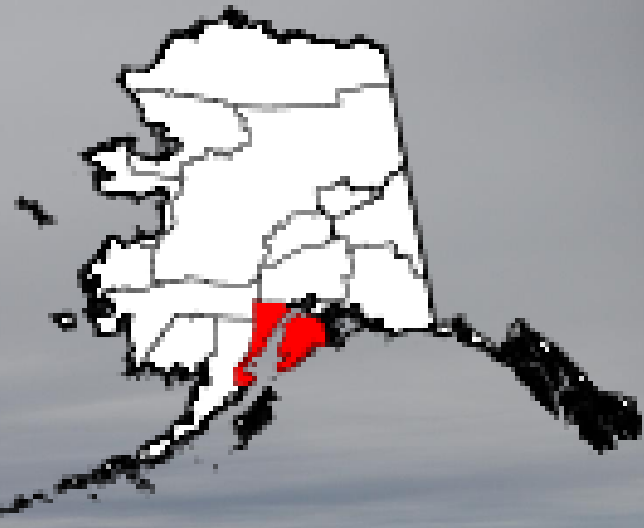






# Kenai Peninsula Borough

Pop. 7800









# Stabilize Soils Control Flows



Kalifornsky Beach Road







Temporary Velocity Control





Kalifornsky Beach Road







Permanent Armor





ADOPT  
A  
HIGHWAY





# Finish As You Go

- Reduce Liabilities
- Create Assets
- Invoice for Progress







- 4 Wheelers
- Snow Machines
- Thrill Seekers
- Idiot Deterrence



# Alaska BMP's

Brush Barrier

Silt Fence

Vegetative Buffer

Wattle

Plastic Sheet Slope Drain





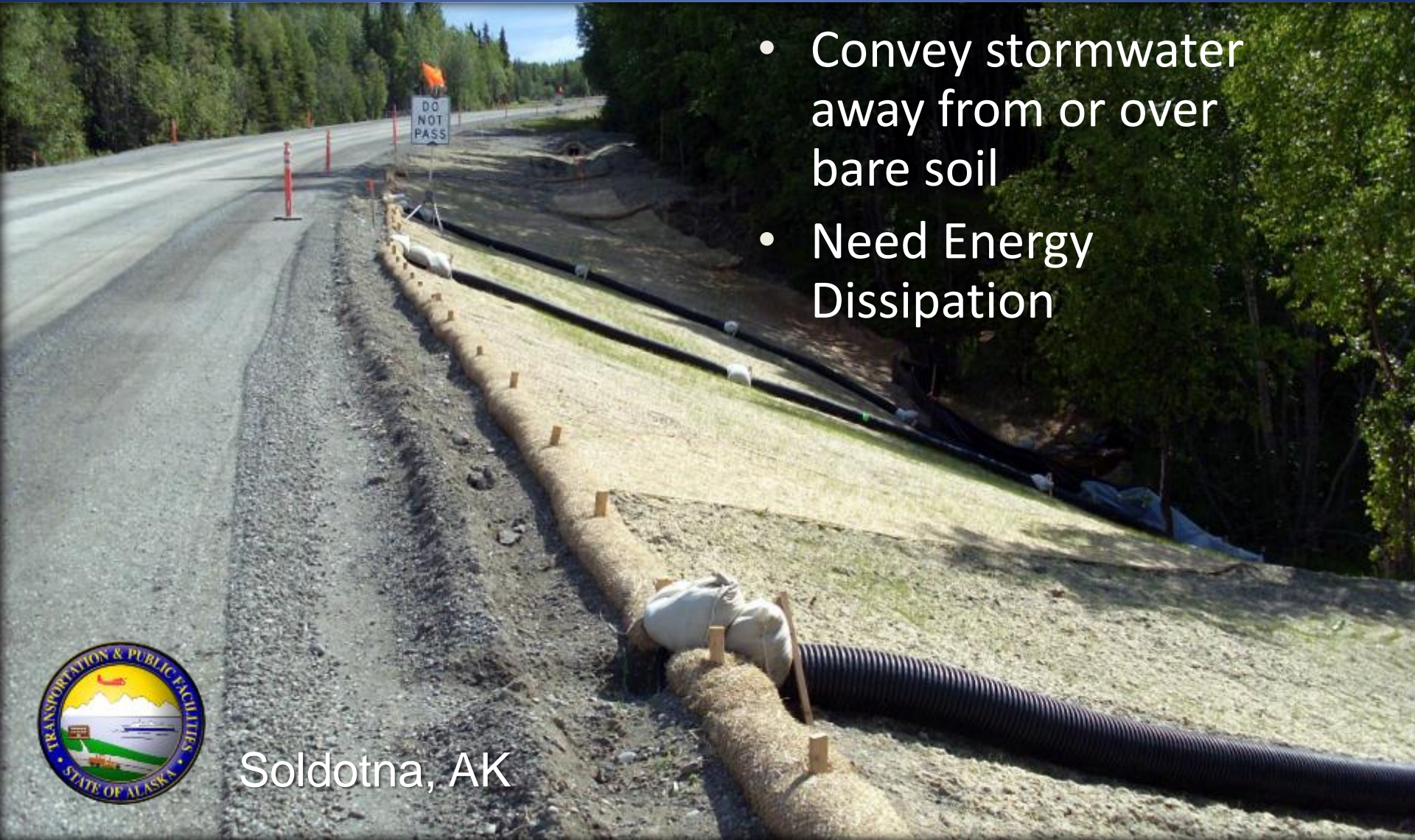
# Pipe Slope Drains

BMP  
WA C-204  
OR RC-1  
AK - 3

- Convey stormwater away from or over bare soil
- Need Energy Dissipation



Soldotna, AK







- Filter Sock
- Pipe Slope Drain
- Temporary Liner



# Dillingham, AK



Pop. 2,143





- Poor Soils
- Low Organics
- Low Fertility
- Topsoil alternative

07.14.2013



- Surface Prep
- Biotic Soil Amendments









# Erosion Control: Bonded Fiber Matrix











- Faster Establishment
- Project Closeout
- Permit termination
- No Maintenance



# Break Up





# Ice Pass Thru & Scour





# Changing Behavior



**Management Measures** - Good construction management is as important as physical practices for erosion and sediment control, and there is generally little or no cost involved.









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